Space Weather Forecast

Issued on Thursday, 23 November 2023 at 01:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of R1 Radio Blackouts throughout. Chance of G1 Geomagnetic Storms, day 4 (26 Nov).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low activity has been observed with common class flares, the largest at 22/0628UTC from AR3492. There are currently twelve sunspot groups on the visible disc, the majority of which are located in the eastern solar hemisphere. The most notable is the aforementioned AR3492, located in the northeast and surrounded by several peripheral spots. This spot group continues to grow and is becoming increasingly magnetically complex.

There are a potential of two Earth-directed coronal mass ejections observed in the past 24 hours, one from a filament eruption in the southeast and another from a dimming event but unknown origin, giving an almost full halo in current imagery. Further imagery is needed for the latter coronal mass ejection and computation of the former coronal mass ejection before they can be confidently included in the forecast.

Solar Wind / Geomagnetic Activity: Solar wind parameters have been indicative of a waning connection to a positive coronal hole. Wind speeds have fallen from elevated to generally slightly elevated. The interplanetary magnetic field has steadily fallen from moderate back to weak. The important north-south component had several periods of moderately negative/southward, peaking at 22/0458 UTC, but has since eased back to weak. Resultant geomagnetic activity was Active with two G1/Minor storm periods early on 22 Nov, before falling back to Unsettled by the end of the 24 hour period.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a daily chance of Moderate, and a slight chance of Strong flares, mainly from current eastern solar hemisphere sunspot regions.

Solar Wind / Geomagnetic Activity: No Earth-directed coronal mass ejections currently feature in the forecast, though a filament eruption in the southeastern quadrant early on 22nd Nov has recently been reanalysed and awaiting computation. Another coronal mass ejection has recently left the Sun, though we await further imagery before a full analysis can take place.

Earth remains connected to the high speed stream of a coronal hole. Elevated solar winds should ease back to slightly elevated or background levels in coming days. No further enhancements are then expected until the arrival of a further coronal hole later on day 3 (25 Nov) or more likely day 4 (26 Nov), with speeds reaching elevated once again.

Unsettled to Active initially with a slight chance of a G1/Minor Storm interval on day 1 (23 Nov). Becoming largely Quiet to Unsettled until the arrival of CH75/+ later on day 3 or on day 4 (25 or 26 Nov), bringing an increasing chance of G1/Minor Storm intervals to end the period.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	5	20	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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